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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,408	11/24/2003	Cha Deok Dong	29936/39763	4107

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EXAMINER

WILSON, CHRISTIAN D

ART UNIT PAPER NUMBER

2891

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/720,408

Applicant(s)

DONG ET AL.

Examiner

Christian Wilson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: search history.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 – 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim *et al.* in view of Liang *et al.*

Kim *et al.* (US 6,620,681) teaches a method of forming a floating gate of a flash memory device comprising the steps of providing a semiconductor substrate **100** with a tunnel oxide film **101** and first polysilicon film **103**, forming a buffer oxide film **105** and a pad nitride film **107**, forming a trench **109** in the substrate, depositing a device isolation oxide film **112**, performing a planarization process using the pad nitride film as a barrier [Figure 2F], performing a strip process to remove the pad nitride film and part of the buffer oxide film at the same time [column 8, lines 40-45], removing the buffer oxide film using a cleaning process [column 8, lines 40-45], and depositing a second polysilicon film **126** which is patterned to form a floating gate with the first polysilicon film [column 8, lines 45-55]. Kim *et al.* does not discuss how much of the buffer oxide film is removed during the strip process. Liang *et al.* (US 6,326,283) teaches an STI forming method where at least 50% of the buffer oxide film is removed with the nitride film during a phosphoric stripping process [column 3, lines 5-10]. It would have been obvious to one of ordinary skill in the art to remove at least 50% of the buffer oxide film of Kim *et al.* during the

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strip process since Liang *et al.* teaches that while protecting the underlying layers during the stripping process the majority of the buffer oxide layer may be removed in one process step which reduces the process complexity.

Regarding claim 2, Kim *et al.* further teaches a buffer oxide layer with a thickness of 30 to 40 Å [column 5, line 63].

Regarding claim 3, Kim *et al.* further teaches a buffer oxide layer formed by plasma enhanced chemical vapor deposition [column 5, line 67]. Kim *et al.* also teaches a PECVD process using TEOS [column 7, lines 60-65]. It would have been obvious to one of ordinary skill in the art to use the PECVD method of Kim *et al.* with TEOS since this is a well known CVD material to deposit for good deposition characteristics.

Regarding claims 4 and 5, Kim *et al.* further teaches a wall oxide film 110 formed at a temperature in the range of 800 to 1000 °C

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited prior art teaches method of forming flash memories with STI.

4. A copy of the EAST search history is enclosed.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian Wilson whose telephone number is (571) 272-1886.

The examiner can normally be reached on weekdays, 7:30 AM to 4 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'CDW', is positioned above the printed name of the examiner.

Christian Wilson, Ph.D.
Primary Examiner
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CDW